

**CLAIMS**

1 1. A method of positioning a selected recording channel on a  
2 recording head relative to an optical servo system in a  
3 read/write assembly comprises:

4 positioning the optical servo system at a first position  
5 relative to the selected recording channel in the read/write  
6 assembly;

7 processing an alignment tape in the read/write assembly  
8 to determine a lateral offset between the optical servo system  
9 and the selected recording channel; and

10 positioning the optical servo system at a second position  
11 relative to the selected recording channel using the lateral  
12 offset.

1 2. The method of claim 1 wherein the alignment tape includes  
2 a track of longitudinal equally spaced apart alignment voids.

1 3. The method of claim 2 wherein processing comprises:

2 writing a track of data to the alignment tape over the  
3 track of alignment voids;

4 imaging a section of the alignment tape to determine a  
5 lateral distance between a center of the track of alignment  
6 voids and a center of the track of data; and

7 setting the lateral offset to the lateral distance.



1 10. The method of claim 2 wherein processing comprises:  
2 writing and subsequently reading a track of data to a  
3 front major surface of the alignment tape on the track of  
4 alignment voids with a write head and a read head of the  
5 selected recording channel;  
6 monitoring a bit-error ratio (BER) from reading the track  
7 of data; and  
8 correlating the bit-error ratio (BER) to the lateral  
9 offset.

1 11. The method of claim 10 wherein correlating comprises  
2 relating a maximum BER to the lateral offset.

1 12. The method of claim 11 wherein a negative lateral offset  
2 value indicates the optical servo system is laterally above  
3 the selected recording channel.

1 13. The method of claim 11 wherein a positive lateral offset  
2 indicates the optical servo system is laterally below the  
3 selected recording channel.

1 14. The method of claim 10 wherein the BER represents a  
2 number of erroneous data bits read divided by the total number  
3 of data bits written.

1 15. The method of claim 2 wherein processing comprises:  
2 providing a plurality of longitudinally arranged equally  
3 spaced apart alignment void tracks on the alignment tape;  
4 moving the recording head across the tracks in a motion  
5 perpendicular to a motion of the alignment tape;  
6 writing and reading a magnetic signal to the alignment  
7 tape by the selected recording channel at a higher frequency  
8 than the frequency of alignment voids moving past the selected  
9 recording channel to determine an amplitude demodulated  
10 magnetic signal;  
11 directing a beam of light by the optical servo system to  
12 the alignment tape to determine an optical signal; and  
13 determining a timing difference between the envelope of  
14 the demodulated magnetic signal and the envelope of the  
15 optical signal.

1 16. The method of claim 15 wherein determining comprises the  
2 timing difference between a peak in the envelope of the  
3 demodulated magnetic signal and a peak in the envelope of the  
4 optical signal.

1 17. The method of claim 15 wherein determining comprises  
2 calibrating the timing difference using the velocity measured

3 from the timing difference between peaks in the envelope of  
4 the optical signal.

1 18. The method of claim 15 wherein determining comprises the  
2 cross-correlation function to find the timing difference  
3 between the envelope of the demodulated magnetic signal and  
4 the envelope of the optical signal.

1 19. The method of claim 17 wherein the velocity is determined  
2 from the separation of peaks in the cross-correlation  
3 function.

1 20. The method of claim 16 wherein the lateral offset is set  
2 equal to the timing difference divided by the velocity.

1 21. The method of claim 2 wherein processing comprises:  
2 providing a plurality of longitudinally arranged equally  
3 spaced apart alignment void tracks on the alignment tape;  
4 moving the recording head across the tracks in a motion  
5 perpendicular to a motion of the alignment tape;  
6 directing multiple beams of light by the optical servo  
7 system to the alignment tape to determine a number of optical  
8 signals; and  
9 determining a timing difference between the envelope of  
10 one optical signal and the envelope of another optical signal.

1 22. The method of claim 21 wherein the optics are rotated to  
2 bring the timing difference divided by the velocity to a  
3 desired value.

1 23. The method of claim 21 wherein determining comprises the  
2 cross-correlation function to find the timing difference  
3 between the envelope of one optical signal and the envelope of  
4 another optical signal.

1 24. The method of claim 1 wherein the alignment tape  
2 comprises:

3 a plurality of longitudinal tracks on a second major  
4 surface of the tape; and  
5 recording channel positioning alignment voids.

1 25. The method of claim 24 wherein processing comprises:

2 suspending the alignment tape in a coupon;

3 positioning the alignment tape with the coupon over a  
4 recording channel pair to position a line from one element of  
5 a channel pair to another; and

6 positioning the optical servo system such that one  
7 generated optical spot is centered on a middle one of the  
8 longitudinal tracks and other generated optical spots are  
9 offset by a desired amount.

1 26. The method of claim 24 wherein the plurality of tracks  
2 are generated by passing the tape through a laser system.

1 27. The method of claim 25 wherein positioning comprises:  
2 viewing the alignment tape under a microscope; and  
3 adjusting the alignment tape's position with a precision  
4 translation and rotation stage attached to the coupon.

1 28. An alignment tape for positioning a selected recording  
2 channel of a recording head relative to an optical servo  
3 system in a read/write assembly comprises:

4 an elongated continuous web of flexible plastic substrate  
5 material having two edges and defining a front major surface  
6 and a back major surface;

7 a magnetic storage medium formed on the front major  
8 surface;

9 an inert medium formed on the back major surface; and

10 a track of alignment voids for indicating actual lateral  
11 displacement of the selected recording channel relative to the  
12 optical servo system.

1 29. The tape of claim 28 wherein the track of alignment voids  
2 is formed by ablation by a pulsating laser beam of sufficient  
3 power to penetrate the back major surface through to the front

4 major surface leaving visible the flexible plastic substrate  
5 of the alignment tape.

1 30. A method of positioning a selected recording channel on a  
2 recording head relative to an optical servo system comprises:

3 fixedly positioning the optical servo system at a  
4 position relative to the selected recording channel;

5 processing an alignment tape to determine a lateral  
6 offset between the optical servo system and the selected  
7 recording channel; and

8 storing the lateral offset.

1 31. The method of claim 30 further comprising aligning a data  
2 track with the selected recording channel using optical servo  
3 system and the stored lateral offset during tape travel across  
4 the selected recording channel.